

CLAIMS

1. A method for production of a low pressure membrane useful for reverse
2 osmosis and nanofiltration which comprises contacting a first membrane
containing a crosslinked polyamide salt-rejecting layer with a solution of an
4 organic sulfonic acid compound for a contact time and at a temperature sufficient
to produce said low pressure membrane having a water flux of at least about 15
6 gfd and a sodium chloride rejection of at least about 20 percent for reverse
osmosis at 75 psi and 25°C using 0.05 weight percent aqueous sodium chloride.
2. A method as in Claim 1 wherein said crosslinked polyamide comprises the
2 reaction product of an aromatic diamine or triamine and an aromatic triacyl
halide.
3. A method as in Claim 2 wherein said crosslinked polyamide comprises the
2 reaction product of an aromatic diamine or triamine, an aromatic triacyl halide
and an aromatic diacyl halide.
4. A method as in Claim 1 wherein said first membrane comprises a thin film
2 composite, flat sheet, hollow fiber or tubular membrane.
5. A method as in Claim 4 further comprising disposing said first membrane
2 into a filtration device prior to contact thereof with said solution of an organic
sulfonic acid compound.
6. A method as in Claim 4 further comprising disposing said first membrane
2 into a filtration device following contact thereof with said solution of an organic
sulfonic acid compound.



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13. A low pressure membrane useful for reverse osmosis and nanofiltration produced according to the method of Claim 1 and having water flux of at least about 15 gfd and a sodium chloride rejection of at least about 20 percent for reverse osmosis at 75 psi and 25°C using 0.05 weight percent aqueous sodium chloride.

- 14/15. A membrane as in Claim 1 having a sodium chloride rejection of at least about 80 percent and a flux of at least about 5 gfd when tested on 0.05 percent aqueous sodium chloride at 150 psi and 25°C.

- 15/16. A composite membrane useful for reverse osmosis or nanofiltration comprising:
- a supportive porous under-structure; and
 - a top layer consisting of a crosslinked polyamide thin film which is adhered to the upper surface of the porous support structure, said top layer having been contacted with a solution of an organic sulfonic acid compound;
- whereby said membrane has a water flux of at least about 15 gfd and a rejection of at least 20 percent when tested on a 0.05 percent aqueous sodium chloride at 75 psi and 25°C.

- 16/17. A composite membrane as in Claim 16 wherein said crosslinked polyamide comprises the reaction product of an aromatic diamine or triamine and an aromatic triacyl halide.

- 17/18. A composite membrane as in Claim 17 wherein said crosslinked polyamide comprises the reaction product of an aromatic diamine or triamine, an aromatic triacyl halide and an aromatic diacyl halide.

- 18/19. A composite membrane as in Claim 16 wherein the porous support is a polyarylethersulfone.

20. A composite membrane as in Claim 16 wherein said first membrane
2 comprises a thin film, flat sheet, hollow fiber or tubular membrane.
21. A composite membrane as in Claim 16 wherein the membrane is a
2 component of a spiral-wound membrane filter or a plate and frame filter.
22. A composite membrane as in Claim 16 wherein said organic sulfonic acid
2 compound comprises a sulfoacetic, sulfobenzoic, sulfoisophthalic, sulfophthalic,
4 sulfosalicylic, sulfosuccinic, hydroxybenzene sulfonic, hydroxybutane sulfonic,
dihydroxy benzene sulfonic or dihydroxy benzene disulfonic or a mixture thereof.
23. A composite membrane as in Claim 16 wherein said organic sulfonic acid
2 compound comprises a C₁-C₈ alkyl, alkenyl, haloalkyl, haloalkenyl or aryl sulfonic
acid compound.
24. A composite membrane as in Claim 23 wherein said organic sulfonic acid
2 compound comprises methanesulfonic acid, trifluoromethanesulfonic acid or a
mixture thereof.
25. A composite membrane as in Claim 22 wherein said organic sulfonic acid
2 compound further contains a C₁-C₈ carboxylic acid, hydroxy, alkoxy or halo
functional group or a combination thereof.
26. A composite membrane as in Claim 16 wherein said solution of an organic
2 sulfonic acid compound comprises said organic sulfonic acid compound
dispersed or dissolved in water, alcohol, glycol, alkoxy alcohol or a carboxylic
4 acid or a mixture thereof.

